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ABSTRACT

This manual provides the background information necessary for the planning of school fire safety programs by local school officials, particularly in Arkansas. The manual first discusses the need for such programs and cites the Arkansas state law regarding them. Policies established by the Arkansas State Board of Education to implement the legal requirements are listed. Principles and procedures affecting required monthly fire drills are explained. Community involvement in fire safety efforts is considered briefly. The manual next reviews the nature and classification of fires and discusses the classification of different areas in school buildings according to the degree and type of fire hazards posed. Safety considerations relative to mechanical and electrical systems are treated next, and adequate housekeeping practices are reviewed. The added hazard posed by community use of school buildings is addressed. The final section of the manual covers safety devices including detection equipment. The report form required for the monthly inspection reports of Arkansas schools is appended. (PGD)

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SCHOOL FIRE SAFETY MANUAL

Arkansas Department of Education
1984

EA 017 808

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SCHOOL FIRE SAFETY MANUAL

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STATEMENT OF ASSURANCE

ARKANSAS DEPARTMENT OF EDUCATION

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FOREWORD

The need for a good fire safety program in our schools is made evident by the heavy toll fire takes every year in life and property. This loss can be lessened through an adequate fire safety program that will instill in our youth habits that will be practiced throughout life.

In order to develop and maintain an adequate program of fire protection, it is necessary to have some knowledge of the problems involved.

It is hoped that this booklet may assist local school officials in planning their school fire safety programs.

D. L. Pilkinton, Interim Director
Arkansas Department of Education
General Education Division

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NEEDS AND RESPONSIBILITY FOR A FIRE SAFETY PROGRAM

Need for a Fire Safety Program

The necessity for a good fire safety program in our schools is pointed up by the nation's annual loss of life and property resulting from fires. These losses have mounted to astronomical proportions.

Fortunately, many school fires occur when the buildings are not occupied which reduces the life safety hazard. However, those that do occur during school hours can and do produce casualties.

For 1900-1958, National Fire Protection Association records show 821 lives lost in 37 fatal school fires in the United States and Canada. Of the 821 total, 358 were lost in explosions. Entering (or reentering) burning buildings cost 14 lives.

The remaining 449 fatalities occured in 14 fires involving a building and/or its contents.

A total of 420 are accounted for by six disasters:

175 lives in 1908	Collingwood, Ohio
22 lives in 1915	Peabody, Massachusetts
77 lives in 1923	Camden, South Carolina
36 lives in 1924	Babbs Switch, Oklahoma
15 lives in 1954	Cheektowaga, New York
95 lives in 1958	Chicago, Illinois

School Fires, An Approach to Life Safety, National Academy of Sciences-National Research Council -P.6

The value of lives lost cannot be expressed in dollars and cents.

Property loss can be calculated in money value. The immediate loss is not the only one. If insured losses are great, the rates are usually high. There is the problem of placing the pupils while reconstruction is carried on and this may very well result in overcrowding in another school, thus hampering education.

State Responsibility

The state, represented by officials of the Arkansas Department of Education or by other designated officials, has a definite obligation to promote the development and maintenance of reasonable fire safety for all students attending school in the state. The Department looks to the State Fire Prevention Association, the Arkansas Inspection and Rating Bureau, the State Fire Marshal and similar agencies for technical advice.

Arkansas passed the following act in 1959 following the tragic school fire in Chicago:

ACT 61 OF 1959

An Act to Authorize the State Department of Education to Cooperate with Local School Boards in the Establishment of School Fire Marshal Programs; and for other Purposes.

WHEREAS, there have been many disastrous and costly school fires which have occurred with startling frequency throughout the United States in recent years that have cost the lives of numerous school children, and

WHEREAS, a number of school districts in this State have established Junior Fire Marshal Programs for the purpose of education and training in fire prevention and methods of evacuation in case of fire emergencies, and

WHEREAS, the recent school fire in Chicago, Illinois which claimed

the lives of ninety (90) school children demonstrates the compelling need for constant training and preparation for the prevention of fires and of methods of coping with fire emergencies, and

WHEREAS, it is believed that an immediate program should be established in the public schools of this State for fire prevention training, NOW, THEREFORE Be it Enacted by the General Assembly of the State of Arkansas:

SECTION 1. The State Department of Education is hereby authorized and directed to cooperate with and assist local school districts in this State in the establishment of an Arkansas School Fire Marshal Program. Such Program shall include, but shall not be limited to, the following:

(a) A periodic review and inspection of all school buildings and facilities for fire and other hazards.

(b) Cooperation with local fire departments and other organizations and persons in making building inspections, suggesting improvements to reduce fire hazards, and dissemination of information designed to make school children and the public more conscious of fire hazards.

(c) The establishment in each school of an adequate plan for evacuation in case of fire.

(d) The training of school children in the means of recognizing fire hazards and of corrective steps to be taken in case of fire. Such training may include the establishment of school patrols consisting of school children to be constantly alert and on duty to detect fires or fire hazards.

(e) To take such additional action as may be necessary to promote the development of programs for fire prevention education and training.

SECTION 2. The State Board of Education shall promulgate reasonable and necessary rules and regulations for the establishment of minimum requirements to be met by the various school districts of this State for a School Fire Marshal Program. On or before September 1, 1959, every school district in this State shall establish and thereafter operate a School Fire Marshal Program according to the requirements established by the State Board of Education, as Authorized by this Act. If the State Board of Education shall determine that any school district in this State has not established and maintains an adequate School Fire Marshal Program as required by this Act, and by the minimum requirements established by Said Board, Said Board shall notify the school district in writing of the deficiencies in the School Fire Marshal Program and shall notify the school district that such deficiencies shall be corrected within thirty (30) days from the date of receipt of such notice. If any school district fails or refuses to correct said deficiencies within the thirty days as required above, the State Board of Education shall thereafter withhold ten percent (10%) of the Minimum Foundation Program Aid of such school district until such time as the Board determines that such deficiencies have been corrected.

SECTION 3. All laws and parts of laws in conflict herewith are hereby repealed.

SECTION 4. The General Assembly does hereby determine that the constant threat of disastrous school fires poses a menace to the lives and safety of thousands of school children of this State; that many schools of this state are operating school facilities that pose a constant fire hazard; that immediate action is necessary to detect and correct such fire hazards; that constant patrolling of school facilities is necessary to reduce fire hazards and to detect fires that have commenced; and, that only by the immediate passage of this Act may said situation be corrected. Therefore, an emergency is hereby declared to exist and this Act being necessary for the preservation of the public peace, health and safety shall be in full

force and effect from and after its passage and approval.

POLICIES OF THE STATE BOARD OF EDUCATION

All fire hazard areas should be inspected often. The local staff can made the inspections and can call on the fire department or the rating bureau for special inspections. The Arkansas State Board of Education has formulated the following policies:

Implementation

The State Board of Education, after due consideration, adopted the following policies which it believed were necessary to the implementation of Act 61 of the 1959 Arkansas General Assembly:

I. That a monthly report be required of all local school districts showing that the district is complying with the provisions of the Act. That the report include a certification statement to the effect that the following items have or have not been accomplished:

1. That an adequate Fire Marshal Program has been activated.

2. That an adequate plan for evacuation of all school facilities has been adopted and placed in operation. That copies of this plan are on file in the superintendent's office and available for inspection.

3. (a) That each school facility has or will be inspected by the most competent person or persons available. This inspection to be carried out at least once during each twelve (12) month period and to cover fire and other hazards.

   (b) Routine check for fire hazards before buildings are locked for the day or night especially after games and large public gatherings.

(c) That a program of training essential to the reasonable protection of the lives of students and property from fire and other hazards has been activated and is in operation in each unit of the system.

II. That the superintendent be required to furnish the State Department of Education, Divisin of Instructional Services, information necessary to determine whether the program has been placed in effect in each unit of the local school system. This information to be made a part of the Annual Report required by the Division of Instructional Services which is due to be filed by each local school district on or before November 15th of each respective school year. The check to be made by the Division of Instructional Services as a part of the annual accreditation visit for each local school district. Any non-compliance found by the Division of Instructional Services will be reported to the Division of School Plant Services. This report to cover the following:

1. That a Fire Marshal Program has been activated in each unit of the local school district.

2. That all fire marshals shall have attained a minimum of sixth grade enrollment level except in units K thru 5, the principal or designee (teacher) will be responsible.

3. That evacuation plans and regularly scheduled fire drills have been placed into effect and that plans for these are on file in the superintendent's office.

4. Indicate whether or not cooperative programs with other agencies interested in fire prevention have been activated.

5. That continuing checks for fire and other hazards are maintained.

6. Provisions for education and training in fire safety.

III. The State Board of Education will encourage all local districts to organize and carry out adequate fire prevention programs and safety programs essential to the protection of the lives of children and other school personnel and in school property.

That in carrying out this part of the program, the State Board of Education will activate a supervisory program designed to implement Act 61 of 1959 and rules and regulations pertaining thereto, as established by the State Board of Education.

IV. By statute the State Board of Eduation is required to withhold one-tenth (1/10) of Minimum Foundation Program Aid where any district fails to comply with the minimum requirements set up in the law and by State Board regulations. In carrying out this responsibility, the State Board will provide a thirty-day grace period for any district reported to be in noncompliance. The withholding of such funds should be subject to the approval of the Commissioner in keeping with state law. Each school is required to file with the State School Safety Supervisor the Monthly Inspection Report. (See Appendix A)

RECOMMENDED PRINCIPLES AND PROCEDURES FOR FIRE DRILLS

Fire drills are required by law to be held in Arkansas Schools at least once each month.

The major purpose of fire exit drills is to insure the safe evacuation of the building by the orderly use of all available exit facilities. Preservation of life takes priority over preservation of property. It is of utmost importance that fire drills be carefully organized and properly supervised to assure effective and efficient operation. Generally speaking, the loss of life in school fires has been due to the following: delays in detecting the presence of fire,

delays in sounding the alarm, and delays in leaving the building.

The School Safety Specialist of the Arkansas Department of Education provides each school with the following list of suggestions:

The school fire exit drill should be a highly significant learning experience for students and staff alike, designed to insure safe progress from the building in event of fire or other emergency. It will be strengthened as an educational device if, immediately following the drill, group discussion within each class gives emphasis to individual responsibilities in an emergency and the need for cooperation with fire drill regulation.

Students and teachers are not panic proof. Knowledge and training to meet emergencies is the best guarantee against panic. To help guard against panic, fire drills must be held without advance warning and specific exits must sometimes be blocked.

School buildings are not fireproof - although some have been improperly called fire proof. The fact that a school building meets minimum state regulations does not necessarily assure a desirable degree of occupant protection. It is advisable, therefore, to exceed such minimum regulations especially in the older more hazardous buildings with wood exterior and/or interior construction. Where such conditions exist, school and fire protection personnel should jointly detail plans for emergency evacuation. Warning devices sensitive to heat and smoke should be installed in any building which is substandard. Although building exit plans will vary somewhat, plans developed in accordance with these basic procedures will be sufficiently uniform to assure that students who move from room to room, school to school, or city to city will understand the basic pattern and signals.

Plans should be reviewed by local fire authorities for recommendation and assistance. However, the responsibility for fire drills rests with the principal. If the local fire chief desires such

a drill, he should arrange it with the principal. The principal should cooperate fully with local fire authorities and be guided by their suggestions on fire safety matters and fire drills.

There should be at least one signal or alarm station on each floor, with locations known to each staff member. All personnel also should know how to notify the local fire department. A plan for this responsibility should be established and clearly understood.

In the event the usual signal might fail, some monitoring system will be necessary to notify all rooms.

At any suspicion of fire, teachers and all staff members must act immediately - without searching for the principal, without waiting for authorization, without seeking for the location or seriousness of a fire. (There is no such thing as a "small" fire.)

In case of actual fire, the following procedure should be followed:

(1) Sound the alarm and evacuate the building.

(2) Notify the fire department.

(3) Search for exact location of fire. If feasible, fire extinguishers may be used by custodial personnel or teachers pending arrival of the fire department.

Specific fire exit drill procedures should be prepared for each school building because of differences in construction and size of the building, number and location or exits, number of students and teachers, and age and characteristics of students.

In developing the exit drill plan, rooms nearest stairways and exits should be emptied first. The shortest route should be selected,

without one line of students having to cross another.

At the teachers' meeting prior to the opening day of school, detailed drill plans should be outlined and explained. Each teacher should be provided with an evacuation plan for the entire school, as well as an exit instruction for his own room. Alternate exit routes should be indicated in case of blocked stairs or exits.

Buildings with corridors leading to one or more open stairways constitute a serious hazard. These may be rendered impassible by smoke within one or two minutes, therefore, warning devices sensitive to smoke and heat should be installed. Special provisions also should be made for evacuation through the windows. (This may indicate the need for outside fire escapes under certain conditions.) If evacuation from a multi-storied building is impossible except by windows, and, if evacuation by the fire department is awaited, clothing and other filler must be stuffed around the door cracks-to retard seepage of gas and smoke. Windows then should be opened for ventilation purposes.

Pupils should receive instruction regarding fire exit drills on the first day of each school year. If different classes use the room during the day, each class should receive instructions. Printed instructions should be posted inside the classroom near the door. Large print is desirable.

Although rapid evacuation of the building is important, orderly and controlled movement is even more important.

To provide practice and confidence in turning in an alarm, this responsibility should be given to different teachers whenever a drill is to be conducted.

Fire exit drills must be realistic, otherwise the planner may unintentionally contribute to uncertainty, confusion, and possible loss of life. They should be held without any advance notice to

teachers or pupils and at irregular times. They should be conducted when pupils are in assembly, the hallway, the lunchroom, and other special areas, as well as when in the classroom. They should provide experience with blocked exits and stairways. If the building has outside fire escapes, these should be used for some of the drills.

In advance of any drill called when students are in assembly, they must be instructed regarding exit lanes and exit procedures. They should evacuate the room in orderly procedure, using designated exits, and each should proceed to an outside re-assembly area assigned to the class and await the roll call.

Drills should provide experience in meeting any possible emergency situation, such as a blocked exit or stairway. This is called an obstructed drill. Neither teachers nor students are informed in advance where the obstruction will be encountered. Students must be instructed about the purpose and procedure of the obstructed drill, however, before it is used.

The first drill of the year should be accomplished with a minimum of haste to acquaint pupils with proper procedure. This drill, held on the first or second day of school, should be announced. It would supplement the required, once-a-month, unannounced drill. As soon as students and staff become familiar with emergency procedures to be followed, drills should be called without warning.

In anticipation of extreme winter weather which may cause a change from established procedure, more frequent drills might be conducted during the fall months. During an extended period of severe weather conditions, a substitute drill may be used. This drill is announced and outer clothing is worn by all. Regular drill procedures are then carried out. If pupils are wearing extra clothing just before or after an intermission, the exit drill might be held at that time.

Everyone without exception should evacuate the building

immediately upon the alarm. It should never be countermanded, even though false or a mistake. There must be no stops for wraps or valuables.

On the first day of the year, student fire marshals should be appointed in each room to assist the teacher. Duties may include making certain that all have left the room, closing the door, keeping the formation compact, helping incapacitated children, and assistance in the maintenance of strict fire drill discipline. No responsibility should be given at the expense of delaying a marshal's exit, however. Alternates should be trained to cover when the student marshal is absent.

All students should immediately come to attention when the alarm is sounded. With the teacher holding the door open, the class will march out of the room in a brisk, orderly manner. After making certain all are out, the teacher will close the door and follow his group. The teacher should take the class record book.

To assist the teacher in maintaining complete control of his class, children must be taught to remain silent during fire exit drills. In time of emergency, a single remark may cause alarm, with resultant confusion, disorder and injury. Pupils must be able to hear the teacher's instructions when and if needed.

In preparing students for the obstructed drill, certain signals must be taught beforehand. Students should be taught to stop the line of movement when the leader raises one arm overhead. Arm pointing to the side indicates direction - right or left. Both arms overhead is the signal to reverse the direction. In heavy smoke conditions where visibility may be poor, pupils should be instructed to keep one hand in contact with the person in front.

If the exit signal should occur when they are in the hallways or restrooms, pupils should be instructed to form in file and immediately proceed to the nearest exit available in a brisk, quiet and orderly

fashion. Running should always be prohibited.

Search of restrooms, dressing rooms or other areas is important. This responsibility may be assigned to non-teaching employees. If the search is done by teachers, they should first join their class to a group under the control of another teacher.

Students in restrooms should join the nearest line of exit and leave the building, reporting to their own class only when they have reached the designated assembly area.

Special provisions should be made early in the school year for the evacuation of handicapped children. If they are unable to maintain position in the line, even with assistance, they should be allowed to move apart from the regular line of march. Classes for the physically handicapped should be scheduled into rooms that have direct progress to the outdoors.

For students who are scantly clad, such as those in swimming classes, it may be best to warn the teacher of the drill. In event of an actual fire, students may be permitted to gather some articles of clothing unless danger is imminent. Then, safety takes precedence over modesty or comfort.

Custodians or other responsible adults should turn off central ventilation fans. Additional staff assignment may be the use of fire extinguishers or giving direction to firemen as to location of the fire. Any non-teaching employee not performing functions and visitors are to evacuate the building.

Shop students should be instructed to turn off motors, torches, forges and other equipment that might create hazard while they are out of the building. Similar action should be taken in laboratories, home economics classes, and the lunchroom kitchen.

If necessary for drill lines to cross roadways at the time of a

drill, some adult must be assigned to control traffic.

After evacuation of the building, each class should move to a pre-determined area away from the danger zone or interference with fire fighters - at least 50 feet from the building - clear of fire hydrants and electric power lines. Having a definite evacuation area for each class will help prevent panic if anxious parents are attracted to the scene of a fire.

To assure that all students are accounted for, the roll should be taken when the class reaches its assigned area. The accounting system is simplified if the "buddy" system (pairing off) has been installed. A messenger from each class will convey the roll call report to the person delegated by the principal and assigned to a definite station. It is most important that every student be accounted for to prevent the need to search the building if there is a fire.

Each class should remain at its assigned area in double file, facing the building until the recall signal is given to return to the building or until dismissed. Because re-entry can be dangerous, no re-entry should be permitted until the re-entry signal has sounded.

Upon return to the classroom following a drill, teacher and class should discuss the good and bad features of the drill and plan for improvement of future drills.

Administrative personnel should be alert to any bottlenecks or confusion which may result during a drill, and should take steps to correct these. Every drill should be timed to determine its efficiency.

All exit doors must be equipped with exit hardware. Hooks and other fastening devices may not be used on any required exit door.

Each school shall post immediately adjacent to each phone the telephone number of the fire department protecting the school. The

fire department should be notified immediately of any fire. Delay in notifying the fire department or in sounding the alarm could be grounds for civil or criminal court action.

Provision should be made for adequate evacuation procedures during evening activities.

The principal should keep a record of each fire drill that indicates date and time of drill, number of students, time required to evacuate building, weather conditions and type of drill (obstructed or unobstructed).

SCHOOL AND COMMUNITY RESPONSIBILITY

To have a worthwhile fire prevention program, it is necessary to keep the public informed and interested in the program. It is a good plan to consider the school fire prevention program as an integral part of the total community program. This would mean mutual responsibility on the part of the school and the community in general. Teachers and administrators can help bring about interest and involvement of the community by their willingness to call upon and use community organizations willing and able to help. Some of the groups are: the parent-teacher organization, church groups, the fire company, the local chamber of commerce, the various service clubs, the local fire insurance company, the inspection bureau, and youth organizations.

The public should be informed about school fire prevention activities and, in turn, school personnel must be aware of hazardous conditions in the community that may serve as a challenge to the school program.

NATURE OF FIRES

The people who are responsible for school fire safety need to understand the processes and results of fire. Despite a long association with fire, there are still gaps in the understanding of the way it acts.

ELEMENTS

Without the elements heat, fuel and oxygen combined in proper balance, combustion of fire cannot occur.

The growth of fire depends on many variable factors making it difficult to establish a single rule to cover all situations where fire is possible.

CLASSIFICATION OF FIRES

The most satisfactory method of extinguishing a fire depends primarily upon the type of material or substance which is burning. For all practical purposes, fires are generally divided into three classifications.

Class "A" fires are defined as fires in ordinary combustible materials such as wood, cloth, paper and rubbish. These are the most common and familiar types of fire.

Class "B" fires involve flammable petroleum products or other flammable liquids. Oils, greases, and gasoline are among the more common substances included in everyday use. Each of these possesses qualities of rapid burning and consequently, spreads very quickly. For this reason, a fire of this type can be of a very serious nature.

Class "C" fires involve energized equipment. It should be noted that Class "C" fires become Class "A" fires when electricity is

disconnected. With this type of fire, the electrical nonconductivity of the extinguishing media is of first importance.

CLASSIFICATION OF HAZARDOUS AREAS

The fire hazard classification of an area depends on the type of construction, the material used, and the activities conducted in a particular area. It is a safeguard to know the fire hazard classification of school buildings.

SITES

Light Hazard Areas

Some light hazard areas are classrooms, hallways, stairwells, gymnasiums, and auditoriums. The ordinary hazard areas include stages, boiler rooms, storage areas, shops, domestic science laboratories and manual training departments.

Places where hazardous materials are present or where hazardous activities occur are considered extra hazard areas.

The problem, then, is to do those things which will provide the greatest reduction of hazards in return for cost entailed. This requires a careful and intelligent plan of action. Regular classrooms, as a rule, have fewer places where fires might originate than do some other areas of a school. However, there may be increased fire hazards in the movable seating arrangement if care is not taken. The seats should never be grouped so that rapid evacuation is hampered. Many rooms are over-crowded and more appliances are available. If care is not taken, these could prevent rapid room evacuation. Any condition that might create fire hazards should be eliminated.

Classrooms for handicapped pupils should be given the same consideration as lower elementary in relation to location on the

ground floor and near exits. Outside exits from each room are more desirable.

General use areas: Auditoriums, gymnasiums, and other school areas where groups of people assemble, constitute a fire hazard. In an auditorium-type situation, whether in a gymnasium or elsewhere, all seating should be arranged in definite blocks, and wide front-to-back aisles should be provided. Often guests who occupy these areas are unfamiliar with school safety regulations which makes it difficult to direct or control their activities. Community involvement in the school safety program would help reduce fire hazards when guests assemble in school buildings.

Special Areas

Obviously, some areas have multiple fire hazards because of the activities that occur in them. Fire hazards exist in most shops. The severity and number depend on equipment, the building, operation procedures, and management of the shop. More hazardous shops should be located in a building outside the regular classroom. All recommended safety precautions for power equipment, heat equipment and housekeeping never should be neglected. In addition to these precautions, adequate means of evacuation, in case a fire does occur, must be provided.

Kitchens - The activities and equipment used in school cafeteria kitchens can readily become fire hazards. Many power-equipped units are used in school kitchens. While few have large motors, small motors can create some fire hazard. All stoves should be properly shielded and vented.

Good housekeeping is a must in the school kitchen.

Science Laboratories - These laboratories may afford many fire hazards. The variety of heating devices, plus the chemicals regularly stored in the science laboratories, makes them especially vulnerable

to fire if they are not carefully planned, operated with extreme care, and well maintained.

Even under proper supervision, inexperienced pupils that are going to work with certain equipment and chemicals may create fire hazards. Pupils should understand the hazards involved. All safety measures regarding building, contents, and occupants should be strickly followed. Those in charge must be aware of the extensive list of possible hazards and the possible hazards and the preventive measures for each.

Home Economics - The department of home economics presents many of the same hazards possible in the school kitchen, plus some peculiar to the home making department. These multiple fire hazards are present through both use and neglect after use. Good planning and operating practices are necessary to eliminate or reduce the effects of the hazards.

Storage Rooms - Storage space is necessary for custodial and maintenance supplies, instructional materials and equipment, chemicals for science instruction, and school records. Adequate space eliminates the tendency to store items in areas that create unnecessary fire hazards. In addition to protecting the material, safe storage also protects the building and occupants.

Junk should be eliminated and the storage room kept clean and in order. Combustible material should be limited in quantity and location. Especially hazardous materials should be prohibited in buildings that are occupied by pupils.

Stage and Stage Wings - No combustibles such as old scenery and paint should be stored on the stage and in the wings. Scenery, curtains and drapes used on the stage should be of fire resistive materials. Temporary wiring for lights and stage equipment should be prohibited.

Incinerators - A number of fires are caused by incinerators because their chimney screens burn out allowing the escape of large pieces of burning material or sparks. Combustible materials should not be allowed to collect near the incinerator.

MECHANICAL AND ELECTRIC SYSTEMS

Heating: It is essential that the people responsible for heating equipment be familiar with the manual prepared by the manufacturer. Competent engineers should inspect the heating plant regularly.

Central heating and boiler system: The safety of boiler systems hinges on proper installation. A nationally recognized organization's code for installation should be followed. Proper insulation is essential where pipes pass through walls or stock rooms.

Central warm air heating system: There must be adequate clearance between the ducts of the central warm air heating system and the building structure to prevent hazardous conditions. Also, no excess dust should be allowed to accumulate inside the duct work. If there is a malfunction of the fire-stop dampers, lack of automatic dampers, or faulty motors, hazards will arise.

Individual room heaters: The three most common types of individual room heaters are gas, electric, or oil-burning. To minimize fire hazards, these heaters should not be installed within 18 inches of wood or other combustible material. The combustion chamber of gas and oil-fired units should be enclosed and should have approved vents to take smoke, gases, and unburned fuel to the outside.

Heat pumps: All controls in a heat pump system should be maintained in a satisfactory condition in order for the unit to automatically stop producing heat if trouble develops. Manual emergency stop controls for the operation of the equipment should be located at accessible and convenient points.

HOUSEKEEPING

Adequate housekeeping practices are important in fire safety. An orderly arrangement should be maintained at all times, leaving all exits unobstructed.

Duties: The school custodian plays an important role in school fire safety. He will be able to discharge his responsibility effectively if he has an understanding of the various mechanical systems of his building. The supervisor and operating personnel should plan schedules and practices that will insure maximum safety against fires.

Cleaning: When done properly and regularly, cleaning can do much to eliminate fire hazards. Some cleaning duties must be done every day while others may be successfully done periodically.

Floors should never be cleaned with gasoline, naphtha, thinners, or other flammable materials. Only approved cleaning agents should be used.

Waste and Rubbish Removal: Wastepaper, sweepings, dirty rags, and other litter and rubbish must be removed daily. Shop areas must be cleaned daily and all sawdust, wood shavings, and any combustible materials should be removed or stored.

Incineration: The furnace is not an incinerator. Rubbish and waste paper should not be burned in it or stored in it during vacation.

Open, frequently-used incinerator pits on school premises are both objectional and hazardous. They are hazardous because they attract children and emit fly ash and sparks when in use. If a community incinerator is not available for school use, the incineration equipment should meet National Fire Protection

Association (NFPA) standards.

If the paper is baled to sell or salvage, no more than one day's supply should be allowed to accumulate. The accumulation should be kept in covered metal drums and stored in a fire resistive, segregated area under custodial control.

Storage: Closets for storage should not be located under stairways or in other places because a fire originating in them might endanger traffic lanes.

Storage closets for highly combustible materials should be of fire-resistive construction and should have self-closing doors.

The use of basement or attic rooms that are combustible for junk storage is particularly hazardous.

Supply storerooms should not be used for the storage of junk. Supplies should be systematically stored.

Decoration: The use of special and holiday decorations should be limited or prohibited. Even partially flammable decorations should be removed promptly.

Ashes and Clinkers: The handling of ashes and clinkers from the school heating plant is a housekeeping problem recognized as a serious one by safety engineers, insurance officials, and others interested in fire prevention and safety.

When live ashes, coals, or clinkers are removed from boilers, furnaces, stoves, or other types of coal-burning equipment, they should be placed in metal containers. These containers should never be deposited on, under or near wood platforms, floors or other combustible materials, nor should they ever be left in coal bins, whether the bins contain coal or not. Maximum safety can be assured only if these containers are removed from the building immediately

after the deposit of refuse in them.

Flammable Liquids: Floor waxes, oils, cleaners, and other flammable supplies should be stored in fire-resistive vaults or closets. Wax applicators and oily rags should be stored in metal cans or cases.

Small amounts of gasoline may be stored in safety containers bearing the underwriters approval label but larger quantities should not be stored in the pupil-occupied buildings.

COMMUNITY USE OF THE SCHOOL BUILDING

School buildings used for community purposes are exposed to prolonged fire hazards more often than those used strictly for day-school purposes. This extra use, desirable as it may be, creates additional housekeeping problems, necessitates greater storage facilities, and often prompts the installation of more electrical equipment.

The non-school user may increase the hazards from fire in several ways. Some of the extended out-of-school activities are carried on at night when fewer custodians or teachers who might provide some supervision are in the building. Out-of-school occupants do not always respond readily to school safety regulations and school employee directions.

SAFETY DEVICES

Some school fires may start because of negligence and carelessness, a failure to observe principles of fire prevention and safety, while others may start in spite of all reasonable precautions. A fire, regardless of the cause, once started, endangers lives and property. The preservation of lives and property depend upon four things: early detection, an effective alarm system, rapid and orderly

evacuation, and local fire department equipment reaching the scene.

Detection Equipment

Most school fires start small and, therefore, can be controlled if detected and attacked before they have time to expand.

Types: A fire detection system that is activated by invisible combustion gases, as well as by smoke, heat, or flame, as a rule allows a few extra seconds for evacuation and provides building personnel with an opportunity to bring the fire under control before it becomes destructive.

The smoke sensitive detection system is very valuable for closing dampers and stopping fans in ventilating ducts and closing fire doors to high-hazard areas when smoke is present at these points.

The flame sensitive detection system is usually not regarded as a desirable school detection system but is used in manufacturing concerns, particularly those having high-hazard areas.

The heat sensitive detectors, when used alone, usually detect the fire only after it is in the final stages. Therefore, the heat sensitive detector has questionable value from the standpoint of early evacuation.

Operation: The Los Angeles Fire Department, in 1959, used an abandoned school building to conduct a series of fire tests. One of these tests was to determine the effectiveness of automatic fire detection equipment under special conditions. The test revealed that automatic heat detection devices detected the presence of fire at about the same time that untenable smoke conditions were reached within the building. Automatic smoke detection devices detected the presence of fire before untenable smoke conditions were reached, but not in sufficient time to allow complete evacuation of the test building.*

Location: The location sites of fire detectors will vary, depending on many factors. A survey of the plant will be necessary and state and local codes should be adhered to. If there are no state or local codes, compliance with the NFPA codes is recommended.

Maintenance: Detection equipment is of no value unless it is operable. A supervisory system that is electronically controlled and will give a warning if anything goes wrong or failure of any component occurs is necessary.

Alarm Equipment

The alarm system is a means of existing emergencies. The primary concern is for safety of lives and secondly for early extinguishment.

Types: The two main types of alarm equipment are manual and automatic. Both types should be installed in school buildings. Even more desirable is a system whic warms occupants of a building and the fire station at the same time. Manual equipment is necessary in the event of failure of the automatic alarm system. If the manual alarm is wired directly to the local fire department, it should be disconnected when fire tests or evacuation drills are underway.

Location: Fire alarm boxes should be clearly marked, readily accessible, and mounted between four and six feet from the floor. It is practical to provide an alarm box near any point of hazard. One box should be located on the first floor and one on alternate floors. If the maximum fire area is 10,000 square feet or more, it is necessary to locate a box on each floor. Additional boxes are needed when it is necessary to travel more than 200 feet from any place on the floor to a box.

Maintenance: The alarm system should be thoroughly tested by responsible officials immediately after installation and regularly,

probably monthly, thereafter. Manufacturers instructions and specifications should be strictly adhered to when making repairs.

Extinguishing Equipment

The procedure for extinguishing a fire is based on the classes of fires and on the location of the extinguishing equipment.

Types: The many types of fire extinguishing equipment fit into one of three major classifications: portable, standpipe hose, and sprinkler.

Portable Extinguishers

The extinguishers that can be carried by one person to the point where the fire has begun, are classed as portable.

Types: Generally, portable extinguishers are classified according to the class of fire they are designed to extinguish. Portable extinguishers that cool and quench for extinguishment are for class "A" fires which are fed by paper, wood, rubber, excelsior and similar material. A smothering action for quick extinguishment is needed for class "B" fires which are those fed by liquids. Class "C" fires are live electrical fires and require a non-conducting extinguishing agent. Too much emphasis cannot be laid upon the necessity to use the right type of extinguisher on Class "C" fires. If the wrong kind is used, the operator may be electrocuted.

Location: Extinguishers should be placed in convenient locations throughout a building. The extinguishers may be mounted on walls, but it is more desirable to have them in wall niches. They should be plainly marked and mounted at about four and one-half feet from the floor.

Distribution: Unless the school offers shop or trade courses, it is usually classified as a "light hazard occupancy". According to the

National Board of Fire Underwriters, a building with this classification requires fire extinguishers for a class "A" fire, with one unit for every 2,500 square feet of floor space. It is advisable to locate these so that one need not walk over 100 feet from the point of fire to get an extinguisher.

The state or local fire marshal or a person with similar authority should determine the number of portable fire extinguisher units needed and the best place to install them.

Maintenance: To insure the proper functioning of a portable extinguisher, periodic inspection and tests are needed. The manufacturer's directions should be followed.

The store pressure water type extinguisher requires having the air pressure checked at least annually. The water cartridge type should have the gas cartridge weighed and water added if required. The water pump tank extinguisher should be discharged and refilled with water annually. A soda-acid water type and a foam type extinguisher should be recharged every year. To check a dry chemical type, the gas cartridge must be weighed and the condition of the dry powder checked.

Standpipe and Hose System

The National Fire Protection Association indicates that, next to automatic sprinkler equipment, a well-maintained, properly designed standpipe system constitutes the best means of extinguishing fires in buildings and furnishes the only reliable method of directing effective fire streams to the upper stories of high buildings in the shortest space of time. Also, standpipe systems are for use by both firemen and occupants of the building.

Types: Standpipe and hose systems are generally divided into the following classes: the wet standpipe system which has water pressure

maintained at all times (This system may be arranged to admit water to the system automatically by opening a hose valve.); a manually operated system which admits water through the operation of a remote valve; and the dry standpipe system which has no permanent water supply.

Location: There can be no definite rule about exact location of a standpipe. Important factors are the water source, pressure and supply. The size of pipe, hose, and nozzles, as well as type and dimensions of construction, will be a determining factor. Additionally. the accessibility of other types of fire control equipment will need to be considered.

Generally speaking, standpipes not less than four inches in diameter with connections for fire department use, are of greater value in tall buildings and other situations where it is difficult to introduce two and one-half inch hose lines from the outside.

The number of larger fire department standpipes should be such that all portions of each story of the building are within 30 feet of a large stream noggle attached to not more than 100 feet of two and one-half inch hose.

The number of smaller standpipes in each building and each section of a building divided by fire walls should be such that all portions of each story of the building are within 20 feet of a nozzle for a first-aid stream when attached to not more than 75 feet of a small hose.

The recommendations of the NFPA for standpipe and hose systems will be a good guide to a safe system.

Sprinkler System

A sprinkler system provides an every ready watchman that operates automatically at the point of fire and reduces fire spread. A

sprinkler system is usually installed on the ceiling and consists of a network of pipes with sprinklers spaced at distances which vary depending upon the areas to be protected.

Types: The two basic types of sprinkler protections are partial and complete. Either of these installations may be one of several types: deluge, wet-pipe, protection, and limited water supply.

Pipes in the dry-pipe system contain air under pressure which prevents water from entering the pipes until needed.

The dry-pipe system is especially practical when pipes are located where temperatures drop to freezing. The dry-pipe system makes it unnecessary to cut off the system because of freezing temperatures. If the area where freezing occurs is small, it may be more practical to use anti-freeze solution in the pipes rather than install a dry system. If, however, the pipes over a large area are subjected to freezing temperatures, the dry-pipe system is the most practical.

The deluge and the pre-action may be either the wet or the dry type. The pre-action type is constructed to sprinkle only the specific area where valves have become activated, while the deluge sprinkles an entire area when activated.

The limited water-supply, as the name implies, is supplied with water from a pressure tank of limited capacity. The sprinklers work automatically as do other systems.

The sprinkler system should have a water flow alarm valve which transmits a signal to a designated point as soon as water starts to flow through the pipes.

Sprinkler Maintenance: For proper maintenance, to keep an effective system, NFPA standards should be strictly adhered to. It also is helpful if the contractor who installs the system provides

charts on its maintenance.

*Los Angeles Fire Department: Operation School Burning, Boston 10: National Fire Protection Association, 60 Batterymarch Street. 1959. p. 29-30.

APPENDIX A

MONTHLY INSPECTION REPORT AS REQUIRED BY STATE BOARD POLICY
FOR ALL SCHOOL DISTRICTS IN KEEPING WITH ACT 61 OF
THE 1959 ARKANSAS GENERAL ASSEMBLY

ficial Name and Number of School District _____.

dress _____ County _____.

FOR THE MONTH OF _____.

Is there at present a School Fire Marshal Program in operation in each unit of the school district?

_____ Yes _____ No

Is there an adequate plan for evacuation of all school facilities in operation?

_____ Yes _____ No

Has each school facility been inspected by a competent person or persons during the last twelve (12) months for fire and other hazards?

If yes, by whom
Name _____.

_____ Yes _____ No

Has routine check been placed in operation for all buildings before the buildings are locked for the day or night especially after games and public gatherings?

_____ Yes _____ No

Has a program of training essential to the reasonable protection of lives of students and property from fire and other hazards been activated in each unit?

_____ Yes _____ No

This is to certify that the answers to the above questions are true and correct to the best of my knowledge and belief.

SCHOOL	DATE OF FIRE DRILL	TIME OF FIRE DRILL	EVACUATION TIME

olph Bryant, Specialist
ool Safety Program

Signed _____ Superintenden
Date _____

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